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Stanciu et al.(10) **Pub. No.: US 2011/0262646 A1**(43) **Pub. Date: Oct. 27, 2011**(54) **SURFACTANT-ASSISTED INORGANIC
NANOPARTICLE DEPOSITION ON A
CELLULOSE NANOCRYSTALS****Publication Classification**(51) **Int. Cl.****B05D 5/00** (2006.01)**B05D 7/00** (2006.01)**B05D 3/10** (2006.01)**B82Y 40/00** (2011.01)**B82Y 30/00** (2011.01)(52) **U.S. Cl. 427/308; 427/343; 977/890**

(57)

ABSTRACT

Natural biopolymers in the form of cellulose nanocrystals (CNC) are shown to have the required characteristics to serve as chemically reactive biotemplates for metallic and semiconductor nanomaterial synthesis. Silver (Ag), gold (Au), copper (Cu) and platinum (Pt), cadmium sulfide (CdS), zinc sulfide (ZnS) and lead sulfide (PbS) nanoparticles, nanoparticle chains and nanowires may be synthesized on CNCs by exposing metallic precursor salts to a cationic surfactant, cetyltrimethylammonium bromide (CTAB), and a reducing agent. The nanoparticle density and particle size may be controlled by varying the concentration of CTAB, pH of the salt solution, as well as the reduction time or reaction time between the reducing agent and the metal precursor.

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